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98003 UTAP

IN THE UNITED STATES PATENT & TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Roger Sandstrom : Examiner: Jennifer H. Gay
:
Serial No. 09/806,220 : Group Art Unit: 3672
:
Filed: May 14, 2001 :
:
Title: Thread Coupling For A :
Drill String For Percussive :
Rock Drilling :

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Enclosed for filing please find the following items:

1. Appeal Brief (in triplicate); and
2. Credit Card Payment Form to cover fee for filing Appeal Brief.

The enclosed Appeal Brief is being filed within two months of the date of the filing of the Notice of Appeal for the above identified patent application.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date indicated below.

Mark P. Stone 1/16/04

MARK P. STONE **(Date of Deposit)**
Reg. No. 27,954

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Filed: May 14, 2001	
Title: Thread Coupling For A Drill String For Percussive Rock Drilling	

#21 Appeal Brief E. Stone 1/29/04

Commissioner for Patents
P.O. Box 1450
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APPEAL BRIEF

I. INTRODUCTION AND BACKGROUND -

Applicant has appealed from the final rejection made in the Official Action dated September 15, 2003 of independent Claim 1 and dependent Claims 2 - 4. Claims 1 - 4 are the only claims pending in this application.

Claims 1 - 4 are reproduced on the attached Appendix.

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II. REAL PARTY IN INTEREST -

The present application has been assigned of record to Uniroc AB, a Swedish corporation, having its principal place of business at S-737 25 Fagersta, Sweden. The Assignee, which owns the exclusive right, title and interest in and to the present patent application, is the real party in interest.

III. RELATED APPEALS AND INTERFERENCES -

Neither Applicant, Applicant's Assignee, or their legal representative is aware of any related appeals or interferences which will directly affect or be directly affected by, or have a bearing on, the Board's decision in the present Appeal.

IV. STATUS OF CLAIMS -

Independent Claim 1 and dependent Claims 2 - 4 are the only claims pending in the present application. These claims were placed under final rejection in the Official Action dated September 15, 2003. No other claims are pending, were cancelled, or have been allowed. This Appeal has been taken with respect to each of Claims 1 - 4.

V. STATUS OF AMENDMENTS -

No amendments or requests for reconsideration were filed by the Applicant in response to the final rejection of Claims 1 - 4 made in the Official Action dated September 15, 2003.

VI. SUMMARY OF THE INVENTION -

The invention defined by appealed Claims 1 - 4 is directed to a thread coupling for a drill string for a percussive rock drilling device. The subject invention is illustrated by FIGURES 1 and 2 of the drawing. FIGURE 1 generally illustrates a drill string comprising a drill bit (1), a drill rod (2), and a shank adapter (3) [Applicant's specification, page 1, fourth and fifth paragraphs]. FIGURE 2 illustrates a thread coupling for the drill string [Applicant's specification, page 1, fourth paragraph]. The thread coupling comprises a male thread (5) arranged on a first drill string element (3), and a cooperating female thread (4) arranged on a second drill string element (2). [Applicant's specification, page 1, last line through page 2, second line]. The first drill string element (3) is provided with a first impact surface (6), and the second drill string element (2) is provided with a second impact surface (7). [Applicant's specification, page 2, lines 2 - 8]. The male thread (5) and the female thread (4) are conical, and crests (8) of the male thread have a radius of curvature which is larger than 30% of the pitch of the thread. [Applicant's specification,

page 2, lines 9 - 16]. In the preferred embodiment of the invention, the angle of the cone defined by the male thread (5) and the female thread (4) is less than 20^{o} [Applicant's specification, page 2, lines 10 - 11].

The relationship between the male and female threads of the thread coupling for the drill string of a percussive rock drilling apparatus in accordance with the present invention, advantageously results in shifting the largest loads applied on the threads away from an area known to the prior art to have a tendency to result in thread breakage, and provides efficient transfer of shock wave energy without overloading the thread coupling [Applicant's specification, page 2, lines 12 - 16; page 1, second paragraph; and page 1, third paragraph]. Shifting of the load applied to the thread couplings from a weaker location to a stronger location to avoid thread breakage is of significant importance in a percussive rock drilling apparatus to which the claimed invention is directed, since this type of drilling apparatus is constantly receiving impact forces during normal operation.

VII. ISSUES PRESENTED FOR REVIEW -

The following issues are presented for review in the present appeal:

1. Whether Claim 1 is unpatentable under 35 U.S.C. 103(a) over DE 1170887 in view of U.S. Patent No. 4,760,887;

2. Whether Claims 2 - 4 are unpatentable under 35 U.S.C. 103(a) over DE 1170887 in view of U.S. Patent No. 4,760,887 in further view of U.S. Patent No. 6,196,598;

3. Whether Claim 1 is unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 4,760,887 in view of U.S. Patent No. 4,549,754 and U.S. Patent No. 5,924,500;

4. Whether Claims 2 - 4 are unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 4,760,887 in view of U.S. Patent No. 4,549,754, U.S. Patent No. 5,924,500, and U.S. Patent No. 6,196,598;

5. Whether Claim 1 is unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 4,760,887 in view of U.S. Patent No. 4,549,754, U.S. Patent No. 5,924,500, and U.S. Patent No. 4,687,368;

6. Whether Claims 2 - 4 are unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 4,760,887 in view of U.S. Patent No. 4,549,754, U.S. Patent No. 5,924,500, U.S. Patent No. 4,687,368, and U.S. Patent No. 6,196,598;

7. Whether Claim 1 is unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 4,861,209 in view of U.S. Patent No. 4,549,754 and U.S. Patent No. 5,924,500;

8. Whether Claims 2 - 4 are unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 4,861,209 in view of U.S. Patent No. 4,549,754, U.S. Patent No. 5,924,500, and U.S. Patent No. 6,196,598;

9. Whether Claim 1 is unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 4,861,209 in view of U.S. Patent No. 4,549,754, U.S. Patent No. 5,924,500, and U.S. Patent No. 4,687,368; and

10. Whether Claims 2 - 4 are unpatentable under 35 U.S.C. 103(a) over U.S. Patent No. 4,861,209 in view of U.S. Patent No. 4,549,754, U.S. Patent No. 5,924,500, U.S. Patent No. 4,687,368, and U.S. Patent No. 6,196,598.

VIII. GROUPING OF CLAIMS -

The final rejection of Claims 1 - 4 made in the Official Action dated September 15, 2003 will be argued by reference to only independent Claim 1.

If independent Claim 1 is deemed to be allowable, dependent Claims 2 - 4, each of which depend directly or indirectly from

independent Claim 1, will be allowable at least for the same reasons as parent independent Claim 1.

IX. ARGUMENT -

Independent Claim 1 has been placed under final rejection based upon five (5) separate combinations of different prior art references. It is well established that prior art references cannot be combined to reject a claim, even if all features of the claim are individually disclosed in different prior art references, unless there is a suggestion or motivation in the prior art itself to combine the references. See, for example, Micro-Chemical, Inc. v. Great Plains Chemical Co., Inc., 41 USPQ 2d 1238 (Fed. Cir. 1997). Moreover, the suggestion or motivation to combine references cannot be based upon use of an Applicant's own disclosure as a guide for combining the right references in the right way. See, for example, In re Fritch, 23 USPQ 2d 1780 (Fed. Cir. 1992); Orthopedic Equipment Co. v. United States, 217 USPQ 193 (Fed. Cir. 1983).

As will now be discussed in greater detail, none of the five separate combinations of different prior art references made by the Examiner in the Final Action are motivated or suggested by the prior art itself. On the contrary, each of the five different prior art references included in the five separate combinations of references applied to reject independent Claim 1 disclose diverse and contrary teachings to the invention defined

by independent Claim 1. Thus, the combination of references applied to reject independent Claim 1 can only be based upon the use of Applicant's own disclosure as a guide for selectively combining different portions of different prior art references, without any suggestion or motivation in the prior art itself to make the combinations. Stated in other words, each of the rejections of Claim 1 is based upon improper hindsight reconstruction of the claim by combining different portions of different references having diverse teachings, using Applicant's own disclosure as a guide for the combination, without considering the full teachings of each of the individual references in their entireties.

Each of the five separate rejections of independent Claim 1 made in the Final Action will now be discussed individually as follows.

* * *

1. Independent Claim 1 has been rejected under 35 U.S.C. 103(a) as being unpatentable over German Reference No. DE 1170887 in view of Jansson et al (U.S. Patent No. 4,760,887). The German reference discloses a drill tube connection having threaded couplings. The disclosure advocates the use of a conical thread, and is severely critical of the use of a cylindrical thread. See, for example, page 1, 2nd, 3rd, 4th, 5th and 6th paragraphs of the English translation of DE 1170887 filed by Applicant on

June 9, 2003, discussing in detail the disadvantages resulting from the use of cylindrical thread couplings for drill tube connections.

On the contrary, the Jansson et al patent (U.S. Patent NO. 4,760,887) discloses a drill string element for a percussion drilling device having only a cylindrical thread. (See Col. 1, lines 30 - 32; Column 3, lines 4 - 6; and Abstract of the Disclosure of Jansson et al).

Thus, the teachings of DE 1170887 advocating use of a conical thread for a drill string and criticizing the use of a cylindrical thread coupling for a drill string, and the teachings of Jansson et al advocating use of only a cylindrical thread coupling for a drill string, are exactly opposite and contrary. As such, there is no motivation or suggestion in the prior art itself to combine these two diverse references in any manner rendering Claim 1 obvious. As a result of the contrary teachings of the two references, the only basis for the combination must be derived from the improper use of Applicant's own disclosure as a guide for selectively combining different portions of the two different references to reconstruct Claim 1 without giving full consideration to the individual teachings of each individual reference in its entirety. The basis for this rejection is therefore contrary to well established law.

2. Independent Claim 1 has been rejected under 35 U.S.C. 103(a) as being unpatentable under Jansson et al in view of Saunders et al (U.S. Patent No. 4,549,754) and Puttmann (U.S. Patent No. 5,924,500). As discussed above, Jansson et al discloses only a cylindrical thread coupling for a percussion drilling device.

Saunders et al discloses only a rotary drilling device, and not a percussive drilling device. In fact, the Saunders et al disclosure is directed exclusively to oil drilling. Oil drilling is deep rotary drilling requiring many drill tubes (See, for example, Column 2, lines 63 - 65 and Column 3, line 57 through Column 4, line 4 of the Saunders et al specification.) Percussive drilling, the subject matter to which Applicant's independent Claim 1 is directed, is not efficient for oil drilling because impact energy would be lost between the many different tubes required in an oil drilling operation so that very little, if any, impact energy would be transferred to the drill bit when drilling at deep levels below the earth's surface.

Based on the above, Applicant submits that rotary drilling and percussive drilling are quite different in nature, each employing different structure and different structural arrangements. As such, Applicant submits that it is inappropriate to combine a percussive drilling device such as that disclosed by Jansson et al, with a rotary drilling device such as that disclosed by Saunders et al.

At page 3, last paragraph of the Final Action dated September 15, 2003, the Examiner states that the Puttmann patent, at Column 1, Lines 11 - 17, "teaches drill rods used in rotary or rotary/percussion drilling therefore teaching that drill rods are interchangeable between rotary and persussion drilling operations." Applicant respectfully disagrees with the Examiner's conclusion. In its further discussion of the operation of the general type of device disclosed by Puttmann, namely a drill rod with a rotary and/or percussion or vibratory drive, the Puttmann specification expressly states that use of this type device in rock formations is unsatisfactory. Starting at Column 1, line 63, the Puttmann specification states:

> "This procedure, however, fails in rock formations since during the curve boring the drill head does not rotate and is advanced only by pushing. Hard soil and rock formations therefore require boring machines having digging or cutting tools which are driven independently of any rotation of the drilling head and which permit mechanical excavation of the ground during the curve boring, i.e. when the drill head is not rotating."

Therefore, at the least, the Puttmann disclosure does not teach that percussive drilling operations are interchangeable with rotary drilling operations where drilling is to be performed in rock formations.

Applicant's independent Claim 1 is expressly directed to a thread coupling for a drill string for percussive rock drilling. Contrary to the Examiner's assertion, there is no teaching in the art, including the disclosure of the Puttmann patent, that

percussive and rotary drilling operations and equipment are interchangeable, particularly for rock drilling operations such as that disclosed and claimed by Applicant.

In view of the above, Applicant submits that the rejection of independent Claim 1 based upon the Jansson et al, the Saunders et al, and the Puttmann patents is not suggested or motivated by the prior art itself. On the contrary, the rejection is based upon a combination of features selected from different prior art references which are combined together to reconstruct Applicant's independent Claim 1 using Applicant's own disclosure as a guide, without giving any consideration to the teachings of the individual combined references in their entireties. As noted, Jansson et al discloses only cylindrical thread couplings, while independent Claim 1 recites conical thread couplings; Saunders et al discloses only a rotary drilling device, while independent Claim 1 is directed to a percussive drilling device; and Puttmann does not provide any teaching of interchangeability of rotary drilling devices and percussive rock drilling devices. As such, the only basis by which Jansson et, Saunders et al, and Puttmann can be combined to reject independent Claim 1 must be derived from the improper use of Applicant's own disclosure as a guide for combining selected portions of the different references to improperly reconstruct independent Claim 1 without giving full consideration to the teachings of the individual references in their entireties.

* * *

3. Independent Claim 1 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al in view of Saunders et al, Puttmann, and Eklof et al (U.S. Patent No. 4,687,368).

With regard to the combination of Jansson et al, Saunders et al, and Puttmann, Applicant respectfully refers to and incorporates by reference the arguments advanced in the proceeding section herein.

The inclusion of the Eklof et al patent in the combination adds nothing to the rejection. The Eklof et al patent is directed to a percussive drill string device. Although the Examiner states that Eklof et al discloses a threaded connection including "...conical male threads (13) located on a first drill string element (10) and conical female threads (12) located on a second drill string element (11)" [page 5, penultimate paragraph of final action dated September 15, 2003], this conclusion is incorrect. On the contrary, the Eklof et al patent discloses only a drill string having cylindrical thread couplings, and not conical thread couplings. See, for example, the Abstract of the Disclosure of Eklof et al which expressly recites "A thread structure for interconnecting two elements in a percussion drill string comprising an interior cylindrical thread and an exterior cylindrical thread..." [emphasis added]. See also Claim 1 of the

Eklof et al patent which states, in pertinent part, "A percussive drill string comprising a first element having an interior cylindrical thread and a second element having an exterior cylindrical thread...". [emphasis added]. Therefore, the disclosure of the Eklof et al patent is contrary to the express recitation in Applicant's independent Claim 1 that the male and female threads are conical, and constitutes a further example of the inappropriateness of the rejection of independent Claim 1 based upon a hindsight reconstruction of the claim using Applicant's own disclosure as a guide for selectively combining different features of different individual references, without giving consideration to the teachings of each of the individual references in their entireties.

* * *

4. Independent Claim 1 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Larsson (U.S. Patent No. 4,861,209), in view of Saunders et al and Puttmann.

The Larsson patent is directed to a threaded coupling for a percussion drill assembly. There is no disclosure in this patent that the threaded coupling is conically shaped, as disclosed and claimed by Applicant.

The Saunders et al patent, as previously discussed herein, exclusively discloses a rotary device, and in particular a rotary

oil drilling device. The Puttmann patent, as also previously discussed herein, has been cited by the Examiner as evidence that rotary and percussive drilling operations are interchangeable.

Applicant respectfully repeats and incorporates by reference herein the arguments previously advanced with regard to both the Puttmann patent and the Saunders et al, namely that the express disclosure of Puttmann teaches against the interchangeability of rotary drilling devices, such as that disclosed by Saunders et al, and percussive drilling devices such as that disclosed by Larsson, at least with respect to rock drilling operations as disclosed and claimed by Applicant.

Therefore, this rejection improperly combines selected features from different references, using Applicant's own disclosure as a guide for the combination, to reconstruct independent Claim 1 without giving full consideration to the teachings of each of the individual references in their entireties.

Applicant further notes that even the Examiner has confused the individual references applied in the rejection. Although the rejection of independent Claim 1 at paragraph 8 of the Final Action is based upon a combination of the Larsson, Saunders et al, and Puttmann patents, the conclusion relating to this rejection at the last paragraph of page 6 of the Official Action

refers to a combination of Jansson et al (not Larsson), Saunders et al and Puttmann.

* * *

5. Independent Claim 1 has been rejected over U.S.C. 103(a) as being unpatentable over Larsson in view of Saunders et al, Puttmann, and Eklof et al.

With regard to the rejection based on a combination of Larsson, Saunders et al, and Puttmann, Applicant respectfully repeats and incorporates by reference the arguments advanced in the prior section herein.

With regard to the inclusion of Eklof et al in the combination, Applicant also repeats and incorporates by reference the discussion of Eklof et al previously advanced herein. More specifically, contrary to the Examiner's assertion that Eklof et al discloses conical male and female threads, the express disclosure of the Eklof et al specification is that the male and female threads are cylindrical, and not conical. As noted, Applicant's disclosure is directed to conical male and female thread couplings for a drill string for percussive rock drilling, and the conical configuration of the thread couplings is expressly recited in independent Claim 1.

Applicant submits that the rejection of independent Claim 1 based upon a combination of Larsson, Saunders et al, Puttmann, and Eklof et al, like the other rejections of independent Claim 1 made in the Final Action, is based upon an improper combination of selected features of prior art references, using Applicant's own disclosure as a guide for the combination, to improperly reconstruct independent Claim 1, without giving consideration to the teachings of the individual references in their entireties.

As in the rejection discussed in the previous section herein, the Examiner has confused the references. Although the rejection of Claim 1 at paragraph 10 of the Official Action is based upon a combination of Larsson, Saunders et al, Puttmann, and Eklof et al, the discussion of this rejection, at page 8, fourth paragraph of the Final Action, refers to Jansson et al (not Larsson), Saunders et al and Puttmann.

* * *

At page 9, last paragraph of the Final Action dated September 15, 2003, the Examiner refers to specific sections of Saunders et al and Jansson et al as providing "...the motivation to combine the references...". Applicant respectfully disagrees. In the first instance, the Examiner refers only to Saunders et al, and Jansson et al, but does not address DE 1170087, Puttmann, or Eklof et al, each of which were included in different rejections of independent Claim 1. Moreover, the specific

sections of Saunders et al and Jansson et al referred to at the last paragraph of page 9 of the Final Action simply do not support the Examiner's conclusion that there is a suggestion or motivation in the prior art itself to combine the different references applied in the five separate rejections of independent Claim 1.

A rejection of a claim based upon a combination of prior art references is proper only if there exists a motivation or suggestion in the prior art itself to combine the references. Even if all features of a claim are disclosed individually in different prior art references, this does not negate the patentablility of a claim in the absence of a suggestion or motivation in the prior art itself to combine the references in any manner rendering the claim obvious. It is improper to reject a claim by selectively combining different features disclosed in separate prior art references, using Applicant's disclosure as a guide for the combination, to reconstruct the rejected claim without give full consideration to the diverse and contrary teachings of the individual references in their entireties.

For the reasons discussed herein, Applicant respectfully submits that the underlying basis for each of the rejections of independent Claim 1 is based upon an improper hindsight reconstruction of that claim, using Applicant's own disclosure as a guide for combining selected portions of "the right references

in the right way". Each of the rejections of independent Claim 1 is therefore improper as a matter of law.

X. CONCLUSION -

Applicant respectfully submits that independent Claim 1 is allowable over the prior art applied in the Final Action, and requests that each of the five grounds of prior art rejection raised in the Final Action be reversed.

Dependent Claims 2 - 4 depend directly or indirectly from independent Claim 1 and thus include all features of this parent independent claim. Therefore, dependent Claims 2 - 4 will be allowable, at least for the same reasons as parent independent Claim 1, if the rejection of independent Claim 1 is reversed.

Respectfully submitted,

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APPENDIX OF APPEALED CLAIMS 1 - 4

Claim 1. Thread coupling for a drill string for percussive rock drilling comprising a male thread (5) and a female thread (4) cooperating therewith, said male thread being arranged on a first drill string element (3) and said female thread being arranged on a second drill string element (2), that said first drill string element (3) has a first impact surface (6) and that said second drill string element (2) has a second impact surface (7), said first and second impact surfaces being arranged to abut against each other, characterized in that said male thread (5) and said female thread (4) are conical and that the crests (8) of said male thread (5) have a radius of curvature which is larger than 30% of the pitch of the thread.

Claim 2. The thread coupling as claimed in Claim 1 wherein the angle of the cone defined by the male thread (5) and the female thread (4) is less than 20^{o}.

Claim 3. The thread coupling as claimed in Claim 2, wherein the angle of the cone defined by the male thread (5) and the female thread (4) is between 2^{o} - 5^{o}.

Claim 4. The thread coupling as claimed in Claim 3, wherein the angle of the cone defined by the male thread (5) and the female thread (4) is 3^{o}.